matching attenuator

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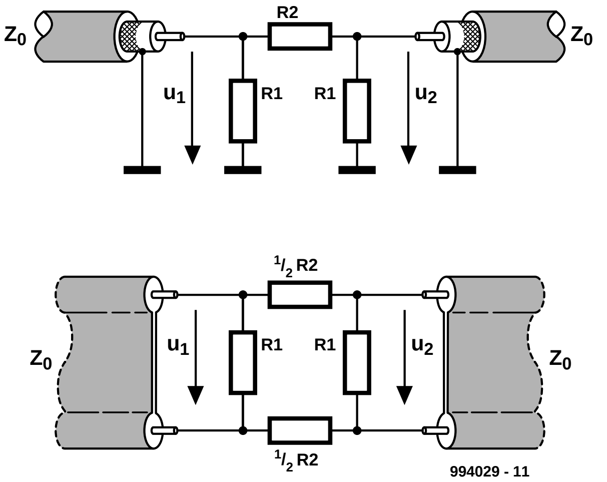

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$$R1 = Z_O \cdot \frac{A+1}{A-1} \qquad R2 = Z_O \cdot \frac{A^2-1}{2A} \qquad A = \frac{U_1}{U_2} = 10^{\left(\frac{-a}{20\,\mathrm{dB}}\right)}$$

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When r.f. signals are (to be) attenuated, it is essential that the requisite network retains correct matching to the relevant (coaxial) cable(s). If this is not so, reflected signal waves will ensue along the cable(s), which may attenuate or magnify the forward signal waves. In other words, there will be points along the cable(s) where the resulting signal is much smaller than the original and others where the resulting signal is much larger.

With the attenuators show in the diagram, the cables are correctly terminated, that is, there is proper matching. If the link is via balanced cables, the network must also be balanced. In that case, there is a series resistor in both signal lines that is half the value of the series resistor used with an unbalanced connection.

The formulas shown give resistor values for both 50 Ω and 75 Ω cables and wanted attenuation as listed in the table.

[994029]

Attenuation	**50 Ω**		**75 Ω**	
	R1	**R2**	**R1**	**R2**
1 dB	909 Ω	5Ω62	1kΩ30	4Ω32
2 dB	475 Ω	10 Ω	619 Ω	18Ω2
3 dB	274 Ω	18Ω2	432 Ω	27Ω4
6 dB	150 Ω	35Ω7	221 Ω	56Ω2
10 dB	100 Ω	68Ω1	150 Ω	100 Ω
15 dB	68Ω1	150 Ω	110 Ω	200 Ω
20 dB	61Ω9	243 Ω	90Ω9	392 Ω